

Framework for valuing green infrastructure and public spaces

This document answers frequently asked questions about the framework, its purpose and how it was finalised.

What is green infrastructure?

Green infrastructure is a network of green spaces, natural systems, and semi-natural systems that supports sustainable communities. This network includes waterways, bushland, tree canopy and green ground cover, and parks and open spaces that are strategically planned, designed, and managed to support good quality of life in an urban environment.

What are public spaces?

Public spaces are all places that are publicly owned or of public use, accessible and enjoyable by all free of charge and without a profit motive. These include:

- **public open spaces:** active and passive (including parks, gardens, playgrounds, public beaches, riverbanks and waterfronts, outdoor playing fields and courts, and publicly accessible bushland)
- **public facilities:** public libraries, museums, galleries, civic/community centres, showgrounds and indoor public sports facilities
- **streets:** streets, avenues and boulevards, squares and plazas, pavements, passages and lanes, and bicycle paths.

Why was the framework developed?

Green infrastructure and public spaces provide social, economic, cultural and environmental benefits to the NSW community. They are also vital to the provision and maintenance of biodiversity in urban areas, mitigating urban heat island effects and increasing resilience to climate change.

These benefits are not easily quantified, documented or evidenced in government decisions compared to those associated with other types of infrastructure. The framework was developed to address this gap, by providing a robust, repeatable and reliable approach to monetise the costs and benefits of green infrastructure and public spaces. The final product sits as a companion to the NSW Government's [Guide to Cost-Benefit Analysis](#).

What does the framework include?

The framework provides a robust, repeatable and reliable approach to valuing green infrastructure and public spaces. It guides practitioners in developing cost-benefit analysis for projects where components of green infrastructure and public spaces are involved. The framework includes guidance on:

- steps in undertaking a cost-benefit analysis
- common benefits and costs
- approaches to valuing benefits including recommended parameter values
- sensitivity testing
- reporting results
- challenges and limitations of economic analysis and common mistakes
- commonly used non-market valuation techniques.

What benefits are included in the framework?

The typical green infrastructure and public space benefits that are included in the framework are:

- use value (recreational benefits)
- use value (health benefits)
- active transport benefits
- air quality
- biodiversity
- greenhouse gas impacts
- urban cooling benefits
- stormwater management
- option, existence and bequest value.

Who will use the framework?

The framework is a public document that can be used by NSW Government agencies to value green infrastructure and public spaces in their business cases. It may also be used by other organisations such as local councils, industry and private organisations when projects include green infrastructure and public space components.

What was undertaken to develop the framework?

Desktop studies

The NSW Department of Planning and Environment commissioned three desktop studies:

- Frontier Economics (2020) Valuing the benefits of green infrastructure for future generations
- Deloitte (2020) The economic value of public spaces.
- Deloitte (2021) Review of public space benefits

These studies identified existing models or valuation methods that other jurisdictions, in Australia and internationally, are using. The studies also identified some preliminary transferable benefits and conducted a gap analysis, based on a literature review, to determine the potential for other benefits to be explored. Findings from these studies were incorporated into the final framework.

Stakeholder consultation

- **November 2020 – March 2021:** An internal working group with practitioners and subject matter experts from the cluster was formed. This included Environment, Energy and Science, Government Architect NSW, Crown Lands, Housing and Property, Office of Strategic Lands, Place-Based Infrastructure, Sydney Olympic Park Authority, Water Utilities. Through workshops, the working group shared their knowledge and experience of existing models or valuation methods and started building an evidence bank that could be included in the framework.
- **August – September 2021:** We held meetings with experts from other NSW Government and Australian Government agencies, overseas governments and academia. They include NSW Treasury, NSW Ministry of Health, Create NSW, Infrastructure Australia, Infrastructure NSW, Transport for NSW, Department of Premier & Cabinet, Department of Education, Office of Sport, Commonwealth Scientific and Industrial Research Organisation (CSIRO), New Zealand Treasury, United Kingdom's Her Majesty Treasury, United Kingdom Department for Environment Food & Rural Affairs, University of Western Sydney, University of Western Australia, Griffith University, University of Melbourne, and University of Sydney.
- **October 2021:** We held a virtual roundtable event where leading economists and policy makers explored innovative valuation and policy approaches that capture the benefits of green infrastructure and public spaces.

Interim framework testing

An interim version of the framework was published online in early 2022 to allow for a period of testing. The proposed methodologies in the framework were tested on existing business cases. The testing also provided findings and recommendations on the usability and functionality of the framework. The final framework incorporated the feedback and findings from the testing, as well as results from further studies.

Willingness to pay study

Two choice modelling studies were completed to help fill some of the gaps in parameter values in the interim framework. The first study estimated NSW residents' willingness to pay for eight typologies of green infrastructure and public spaces in NSW, while the second study estimated willingness to pay for new and improved public spaces. The results from these studies were incorporated into the framework to value additional facilities at urban parks and sport fields and to change the parameter values for use value of six types of public facilities included in the framework.

When was the framework finalised?

The final framework was approved by the Minister in June 2023, with endorsement from NSW Treasury. It was published on the [department's website](#) in October 2023.

Definitions

Table 1. Key terminology

Term	Definition
Amenity value	Characteristics that influence and enhance people’s appreciation of a particular area. The idea that something has worth because of the pleasant feelings it generates to those who use or view it.
Base case	The scenario against which proposals are compared, and which shows baseline projections of costs and benefits ‘without’ the project or program. It is generally a ‘business as usual’ or ‘no policy change’ case, that is retaining the status quo.
Benefits	Increases in social wellbeing.
Benefit transfer	A method of estimating benefit based on the use of findings of previous studies on similar projects or initiatives. Commonly used for valuing health or environmental impacts for cost-benefit analysis.
Consumer surplus	The difference between the maximum amount that consumers are willing to pay and the actual amount they pay.
Contingent valuation	A survey method to place a value on a non-market good, contingent on it being available. Willingness to pay for (or willingness to accept payment for damage to or reduction of) a good or service is treated as a proxy of the value of the good or service.
Cost-benefit analysis	An evidence-based method to appraise and evaluate initiatives. It helps government understand economic, social and environmental impacts of policies and projects.
Choice modelling	Model the decision process of an individual or segment via revealed preferences or stated preferences made in a particular context or contexts. Typically, it attempts to use discrete choice (A over B; B over A, B and C) in order to infer positions of the items (A, B and C).
Cultural services	One of the 4 categories of ecosystem services. It includes spiritual and religious values, knowledge system, sense of place, education and inspiration, recreation and aesthetic values.
Direct-use value	Obtained through a removable product in nature, such as food, fuel or recreation.
Economic valuation	The value that person places on a good or service based on the benefit that they derive from the good or service.

Term	Definition
Ecosystem services	The benefits provided to humans through the transformations of resources (or environmental assets, including land, water, vegetation and atmosphere) into a flow of essential goods and services. Four categories of ecosystem services are: Provisioning services, Cultural services, supporting services, and Regulating services.
Existence value	Places or a resource that will never be used by current individuals, derived from the value of satisfaction from preserving a natural environment or a historic environment for future generations.
Hedonic pricing method	This approach uses the value of a surrogate good or service to measure the implicit price of a non-market good. For example, house prices can be used to provide a value of environmental attributes.
Indirect-use value	Obtained through a non-removable product in nature, such as flood control, pollination, and pest control
Marginal benefit	The benefit accruing to society from the production of an additional unit of a good or service.
Market valuation	The value of an asset that would be paid for with its market price.
Non-market valuation	The value of an asset that could not be easily valued through observed prices in the marketplace. These types of goods and services are typically not traded in markets. Non-market valuation includes revealed preference methods and stated preference methods.
Non-use value	Values for existence of the natural resource.
Option value	Placed on the potential future ability to use a resource, even though it is not currently used, and the likelihood of future use is very low. This reflects the willingness to preserve an option for potential future use.
Parameter value	Standard parameters to estimate costs and benefits of project of a similar nature.
Public facilities	One of the 3 typologies of public space. It includes public libraries, museums, galleries, civic/community centres, showgrounds and indoor public sports facilities.
Public open space	One of the 3 typologies of public space. It can be active and passive space such as parks, gardens, playgrounds, public beaches, riverbanks and waterfronts, outdoor playing fields and courts, and publicly accessible bushland.

Term	Definition
Provisioning services	One of the 4 categories of ecosystem services. It includes food, fuel, fibre, genetic resources, nutrients, fresh water.
Revealed preference	Choices that individuals have actually made (rather than what they stated that they would make).
Regulating services	One of the 4 categories of ecosystem services. It includes invasion resistance, pollination, climate regulation, disease regulation, natural hazard protection, water purification, herbivory, seed dispersal, pest regulation, erosion regulation.
Stated preference	Users' response to hypothetical situations.
Streets	One of the 3 typologies of public space. It includes streets, avenues and boulevards, squares and plazas, pavements, passages and lanes, and bicycle paths.
Supporting services	One of the 4 categories of ecosystem services. It includes primary production, provision of habitat, nutrient cycling, soil formation and retention, production of oxygen, water cycling.
Total economic value	A concept in cost-benefit analysis that refers to the value derived by people from a natural resource, a heritage resource made by humans or an infrastructure system, compared to not having it.
Tree canopy	The layer of leaves, branches, and stems of trees that covers the ground when viewed from above.
Waterways	Either constructed or natural waterbodies including rivers, creeks, ponds, lakes, wetlands, bays, and harbours where a significant part of their catchment either comes from or flows through urban areas.
Willingness to pay	The maximum amount a person or business would be willing to pay in order to consume a good or service.